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ALASKA AGRICULTURAL EXPERIMENT STATIONS
SITKA, ALASKA

Under the supervision of the
UNITED STATES DEPARTMENT OF AGRICULTURE

REPORT OF THE ALASKA AGRICULTURAL EXPERIMENT STATIONS

1922

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ALASKA AGRICULTURAL EXPERIMENT STATIONS, SITKA, KODIAK, RAMPART, FAIRBANKS, AND MATANUSKA.

[Under the supervision of the States Relations Service, United States Department of Agriculture.]

A. C. True, *Director.*
E. W. Allen, *Chief, Office of Experiment Stations.*
Walter H. Evans, *Chief, Division of Insular Stations, Office of Experiment Stations.*

STATION STAFF.

C. C. Georgeson, *Agronomist in Charge.*
G. W. Gasser, *Assistant in Charge, Fairbanks.*
W. T. White, *Assistant in Charge, Kodiak.*
B. L. Schneider, *Assistant in Charge, Matanuska.*
E. M. Floyd, *Assistant in Charge, Rampart.*
M. D. Snodgrass, *Specialist in Demonstration and Extension Work, Fairbanks.*
H. O. White, *Assistant, Kodiak.*
Hans Lindberg, *Horticulturist, Sitka.*

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Under the supervision of the
UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D. C. December 31, 1923

REPORT OF THE ALASKA AGRICULTURAL EXPERIMENT STATIONS, 1922.

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REPORT OF THE AGRONOMIST IN CHARGE.

By C. C. Georgeson.

INTRODUCTION.

The World War retarded the development of Alaska and reduced the population by thousands, young, unattached men being drafted into the Army, and many others leaving for the States to work in the shipyards or elsewhere. The country has been slow in recovering, but, judging from present indications, it is thought there will be an increasing influx of people year by year. As the Territory is settled other experiment stations will be needed to take care of the problems arising in districts not now represented by the present stations. The building of the Government railway is doing much to encourage settlers to take up land. Mines are reopening and lumbering is becoming an important industry, several million feet of lumber having already been exported to other countries. Millions of acres await settlers who will establish homes here. The gradual development of the natural resources will of itself call for an influx of people and a consequent development of agriculture, along with mining, lumbering, and the production of oil.

WEATHER CONDITIONS.

During 1922 the weather conditions were unfavorable for crop production. Precipitation in the interior valleys was unusually heavy, and only little sunshine filtered through the usually overcast skies between the rainy intervals. Varieties of grain hitherto maturing between August 1 and August 20 tillered anew from the roots as a result, and by the end of the month bore heads in all stages of development, few of which fully matured. A cold wave passed over the Territory during the latter part of August, and in some places the temperature dropped to 21° F., which was destructive to full crops of grain. Owing to failure of much of the grain to mature sufficiently for milling purposes, the farmers very generally cut their crops for hay. As a result, there is an abundance of grain hay in the interior, but only a small quantity of grain for seed, and none at all for the flour mill at Fairbanks.

GRAIN CROPS.

In 1921 the farmers in the Tanana Valley raised 3,500 bushels of spring wheat which was ground into flour and consumed in local towns and settlements. Even a larger area was seeded in 1922, but with the results as stated. This is the first time that early-maturing spring grains have failed so completely in Alaska. The stations have demonstrated that it is necessary to grow only early-maturing grains to circumvent cold waves and early frosts, and have introduced the varieties now in general culture.

SPRING WHEAT.

Siberian No. 1, a Russian variety which originally came from Siberia, never before failed to mature. Of the many Siberian sorts tested, this one has been the most successful and most extensively grown by the farmers of the Tanana and Matanuska Valleys. A small area was seeded to Romanow, another Russian variety which has usually matured hitherto. This wheat is not as good a yielder as Siberian No. 1, and is a week or so later in maturing, and for this reason has not become popular.

In the Fairbanks district, an area of about 175 acres was sown to Siberian No. 1 and Romanow, both of which had to be cut when the freeze came. Very little was harvested for seed. Had the wheat been cut when the cold wave was threatening a large part of it doubtless could have been used for seed purposes, and there would have been no shortage of seed wheat in the interior. No seed having been saved, however, the Fairbanks' Farmers' Agricultural Association imported 50 tons from South Dakota for seeding in 1923.

At the Matanuska station, selected portions of wheat from some 10 acres yielded about 35 bushels, which will be enough to supply seed to the farmers of the district. Fully 85 per cent of this grain germinated, although it had been frosted and was not ripe at the time of harvest. (Pl. I, fig. 1.)

At the Rampart station, approximately 10 bushels of seed wheat was on hand, which quantity, together with that which can be spared from the Matanuska station, will be distributed among the farmers in the Fairbanks district for the purpose of starting a new crop.

FIG. 1.—SIBERIAN NO. 1 WHEAT, MATANUSKA STATION. FROST INJURED, BUT SHOWED 85 PER CENT GERMINATION.

FIG. 2.—FIELD PEAS, WINCHESTER RANCH, MATANUSKA VALLEY.

WINTER WHEAT.

Winter wheat was not grown in the Fairbanks district. Up to the present time no variety has been found to survive the winters there. At the Matanuska station, 3° farther south, the varieties Kharkof, Kanred 5146, Kanred 2414, Kanred 2415, Turkey Red, and Red Rock were sown on a southern slope where the wind does not blow the ground bare of snow. Had they not been sown in this protected place, all these wheats doubtless would have winterkilled. As it was, Red Rock winterkilled, and the other varieties were damaged from 20 to 40 per cent.

Although there are no winter wheat areas in Alaska, experiments with these varieties will be continued. The writer has learned of a variety, known as Fortyfold, which thrives in the high plateaus of eastern Oregon where the snow does not always afford much protection and the winters are sometimes severe. The variety will be tested at the Alaska stations. It is thought, however, much safer to plant spring wheat than winter wheat, even if a comparatively hardy variety of the latter is found. The stations will, therefore, continue experiments for the production of varieties maturing early enough to escape the fall frosts.

BARLEY.

Barley matures earlier than either spring wheat or oats and undoubtedly will eventually be as much in demand as a stock feed in the interior as corn is in the States. A very large number of varieties of barley have been maturing at the Rampart and Fairbanks stations for the past 15 years. Only those of high yielding quality which mature early and have stiff straws but no beards are recommended for use. The beards are objectionable in stock feed when the crop is grown for hay, and they help to cause breaking of the straw and lodging of the grain by catching wind and moisture. To be desirable barley should have stiff straw, yet very few of the standard varieties from the States have straw sufficiently stiff to withstand the storms that invariably occur during the growing season. Beardless and Hull-less are the two most successful standard varieties so far grown in the interior. Beardless is not altogether desirable, the straw being short and the crop a light yielder when it is sown for hay, and a large percentage of the heads break off during harvesting when it is sown for grain. Hull-less is a light yielder of both hay and grain. The stations will continue in their efforts to develop varieties showing improvement over these two sorts.

The barley crop of the farmers both in the Fairbanks and the Matanuska districts was for the most part sown for hay, for the reason that there are few herds in these regions as yet and therefore there is not much need for grain for stock feeding.

OATS.

The farmers of the Fairbanks and Matanuska districts grow oats chiefly for hay, using quite generally the commercial varieties, or any large, vigorous, leafy sort for the purpose. When sown for hay, oats need not essentially be an early type to mature seed.

Finnish Black, the seed of which was obtained originally by the stations from the United States Department of Agriculture, is so far the best oats introduced into Alaska and the leading variety of the Matanuska Valley. It attains a height of between 5 and 6 feet, bears open heads, has stiff straw, an abundance of leaf, and does not lodge to any great extent. The kernels are small, long, slender, and of light weight, and the hulls are black or gray. This oat has invariably matured in all parts of Alaska before the occurrence of early fall frosts. That portion of the crop which was sown for grain in the Matanuska Valley in 1922 very generally matured, but only a small percentage matured in the Fairbanks district. The stations have been trying for some years to produce improvements on the Finnish Black and several of the commercial oats often sown for hay and have succeeded to a large extent.

Leader, a tall, leafy side-oats, too late to mature in interior Alaska, is proving of value as a silage crop at the Matanuska station. Kherson, an early-maturing white oat which is gaining in favor in the interior, matured in 1922. Other standard varieties grown both at Matanuska and at Fairbanks are Burt's Extra Early; Canadian and Victory, two white oats; Norwegian, a black oat which has never failed to mature at Fairbanks and Rampart, and which is nearly as early as Finnish Black; Banner, a white-grained commercial variety which usually matures in the interior; and Hansen, a vigorous-growing oat which is often cut for hay.

HYBRIDIZATION WORK.

The stations have been working for many years to develop varieties of grain that shall be better suited to Alaskan conditions than are those which can be obtained from outside sources, growing a large number of varieties in small plats, often in single short rows for purposes of comparison and hybridization. Some notable successes have been obtained, but the ideal variety of wheat, barley, or oats has not as yet been found.

Hybridization work has been done at the Rampart station, which is within 1° of the Arctic Circle, it being thought that varieties succeeding there can be grown in sections of the interior south of 65° 30′. The funds do not permit of the hiring of a plant breeder for each station, and the work has been carried on by, or under the immediate supervision of, G. W. Gasser, expert grain hybridizer, who was formerly in charge of the station.[1] As a result of his work, several varieties of spring wheat, barley, and oats have been originated. Hybrid No. 30 (Siberian No. 1 × Marquis) is one of the leading varieties of wheat. Hybrid barley No. 19 (Hybrid barley No. 1 × Hull-less) is a tall-growing, 6-rowed, hull-less and beardless barley having very large heads and remarkably stiff straw. It is destined to become a leading sort in the interior, although it is not quite as early as could be desired. Only a portion of it matured at Matanuska during the past unfavorable year. Other early hybrids are Nos. 20 and 28, both of which are black and for that reason probably not destined to become popular. Hybrid No. 14 has several types, one of which is 2-rowed and the other 6-rowed. Both are beardless, have stiff straws, and are

[1] Transferred to Fairbanks Station July 1, 1921.

the result of a cross between Hull-less (S. P. I. No. 19851), a well-known commercial variety, and Abyssinian (G. I. 362), which is a bearded, black, 2-rowed sort. A third selection from the same cross is remarkable for very long, heavy heads, but it has weak straw, bearded heads, and invariably lodges.

Among the oats, hybrids Nos. 25 (Copperfield × Finnish Black), 35 (Hybrid No. 25 pollinated with South Dakota, G. I. 637), and 51 (Hull-less × Norwegian) have been the most promising varieties, at least for certain sections of the interior. They did not mature last year at Fairbanks, and matured only in part at Matanuska, where they were caught in the early freeze.

The condition of the grain plats at the Matanuska station September 1, 1922, was as follows: Spring wheat: Siberian No. 1, fine stand, vigorous growth, beginning to turn; Prelude (a hybrid produced at Ottawa Experiment Station, Canada), fair stand, questionable if any will mature; Romanow, excellent stand, but not ripe. Barley: Hybrid No. 19, magnificent growth, not lodged, beginning to ripen; hybrid No. 28, black, 6-rowed, inferior to No. 19, beginning to ripen; Hybrid No. 14a, 2-rowed, beardless, beginning to turn; Hybrid No. 14b, 6-rowed, beardless, barely beginning to turn. Commercial varieties of barley: Oderbrucker, green, grain in milk stage; Bark, bearded, dense heads, partly ripe; Hull-less, lodged exceedingly, not mature; Beardless, fine stand, partly ripe. Oats: Hybrid No. 25, magnificent growth, about 25 per cent ripe. Commercial varieties of oats: Leader, heavy growth with grain in milk stage; Kherson, partly lodged and partly ripe; Gold Rain, lodged extensively, beginning to ripen; Minnesota No. 7, lodged exceedingly, few heads beginning to turn; Wisconsin Pedigree No. 1, lodged very much, beginning to turn; Finnish Black, excellent stand, not lodged, ripe; Burt's Extra Early, not lodged, ripe.

LEGUMES.

Legumes are destined to play an important rôle in the agriculture of Alaska. They will be used not only for hay and pasture, but also for the purpose of renovating and fertilizing the soil. Since the long winter feeding period precludes the raising of herds in large numbers for meat or for dairy purposes, the supply of barnyard manure will necessarily be limited, and the farmer must have recourse to some other method for maintaining and increasing the productivity of the soil. Leguminous crops can be made to take the place of the more expensive fertilizers, and the stations have, therefore, from the beginning, made a persistent effort to introduce and disseminate legumes which will meet the requirements of the farmer for hay, pasture, and fertility. Experiments with leguminous crops are now under way at Fairbanks, Rampart, Matanuska, and Kodiak.

The common alfalfas were tested at the Rampart Station some years ago. Grimm alfalfa, the hardiest strain of *Medicago sativa*, withstood the winters for two or three years, but died the fourth year. Evidently, no form of common alfalfa can be recommended for general planting in the interior. Of several varieties of grass, clover, and alfalfa seed received in small quantities from the United States Department of Agriculture in 1909, only one (*M. falcata*, S. P. I. No. 24452) survived. Seed of this variety has been increased in quan-

tities each year until now there are 10 acres planted to this crop at the Rampart station. This species of legume has been found absolutely hardy, surviving the winter in places where other alfalfas winterkill. It is the most valuable legume so far discovered for interior Alaska.

Cherno, Cossack, Orenberg, Semipalatinsk, and other varieties of Siberian alfalfa have been tried, but they have not equaled the above strain of *M. falcata* in hardiness or in seed-bearing qualities. Owing to the unfavorable weather of 1922, no seed of any of the alfalfas under experiment was saved.

Next to *M. falcata*, the most valuable legume for interior Alaska is *Vicia cracca*. It is a hardy perennial vetch which never freezes out. This species bears seed very sparingly, but propagates freely by rootstocks, so that plants seeded in rows 2 feet apart become a mass of green forage standing 2 feet or more in height. It propagates slowly and for this reason will never be as important a legume for the interior as is the yellow-flowered alfalfa.

Trifolium lupinaster is a hardy legume, but, owing to its low-growing habit and lack of vigor, is of comparatively little value. This species of clover is perennial in habit and matures seed freely, but seldom attains a height of more than 5 or 6 inches, nor does it spread in mass form.

The common clovers have all been tried but found wanting. White clover is hardy, but furnishes only a small quantity of forage. Alsike clover survives the winter when protected with snow covering, but it can not be called hardy in the sense that the yellow-flowered alfalfa is hardy. Red clover, on the other hand, invariably winterkills, but it is of value as an annual crop and as a soil renovator. Sown early in May, during a fairly favorable season, this crop will reach a height of 2 feet by the end of August and can be either cut for hay or plowed under. All of these clovers yielded a fair quantity of forage in 1922.

Sweet clover (*Melilotus* sp.) in its various varieties has been tested at the Matanuska station, and in a small way at the Rampart and Fairbanks stations, and found not adapted to these regions.

Field peas that mature early enough to produce ripe seed before frost promise to be one of the important crops for interior Alaska. (Pl. I, fig. 2.) Alaska, which was originally grown in the garden at the Rampart station, where it matured seed, is being grown on several acres at each of the stations for seed production. The common field varieties, unlike the Alaska, seldom mature seed in the interior. The development of an early-maturing variety perpetuating itself by seed production is considered an important achievement, more especially since the shipment of pea seed from the States into the interior is expensive.

SILAGE.

The production of winter feed is a problem confronting the farmers of the interior who keep a few cattle. Since the feeding season extends over practically eight months, silage should be made whenever possible, especially for dairy cattle. Any kind of green forage can be made into silage. At the Matanuska station vigorous varieties of oats have been given precedence for this purpose, the variety

THREE COWS, FIRST GENERATION GALLOWAY-HOLSTEIN CROSSES. GALLOWAY COLOR AND ABSENCE OF HORNS. EARLY MILK YIELDS ABOUT INTERMEDIATE BETWEEN THE TWO BREEDS.

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Leader proving best of the many sorts tried. Grown with peas or vetches, oats makes excellent silage. Native grasses, especially wild rye (*Elymus mollis*) and a tall sedge (*Carex cryptocarpa*), which grows somewhat freely on low, swampy ground, have up to the present time been relied upon for silage at the Kodiak station. Several species of Calamagrostis are also used in part for silage, but they are better for hay than for silage. Sunflowers and horse beans were grown during the year at the Matanuska station for silage, but neither was vigorous enough to yield crops equal to those of oats and peas. Of the tame grasses, smooth brome grass (*Bromus inermis*) is best, being perfectly hardy and yielding more hay than timothy or any other grass so far tried. It starts growth early in the spring and is especially well suited to low-lying land, where it

FIG. 1.—Shorthorn bull, Waterloo Heir.

forms a dense sod. The surviving tame grasses, tested in 3-year-old plats at the Matanuska station during the summer of 1922, included *B. inermis*, Kentucky bluegrass, redtop, Canadian bluegrass, and timothy, which rank in the order given. Meadow fescue, English rye grass, and Italian rye grass did not survive the third winter.

LIVESTOCK.

CATTLE.

The Alaska stations are maintaining a few head each of the Galloway, Holstein-Friesian, and Milking Shorthorn breeds. The Galloways and Holstein-Friesians are kept at Kodiak, the former being introduced there in 1907, and the latter in 1916. The Galloways are admirably adapted for beef, and are very hardy, excellent rustlers suited to southwestern Alaska. The Holstein-Friesian are milk cattle par excellence, but having a scant supply of hair are rather

sensitive to the rigorous weather peculiar to that section. At the close of the year there were 4 breeding cows, 3 yearling heifers, 3 heifer calves, 2 bull calves, and 1 herd bull in the Galloway herd, and 2 cows, 2 two-year old heifers, 1 bull calf, and 1 herd bull in the Holstein-Friesian herd.

Galloway-Holstein crosses.—The Holsteins were introduced at the Kodiak station for the purpose of building up a dairy breed that will be especially adapted to Alaskan conditions. The Galloways are at home in Alaska and would be an ideal breed for family use were they good milkers. Reciprocal crosses are being made in the hope of producing a breed that will combine the hardiness and rustling qualities of the Galloways with the milking qualities of the Holstein-

FIG. 2.—Shorthorn cow, Starlight 7th, milking Shorthorn at Matanuska Station.

Friesians. The experiment will, of course, take time, and many of the cross-bred animals will likely be rejected for those possessing the characteristics sought. So far the offspring have been better in milk average than the Galloways, although they do not equal the purebred Holstein. In the cross nearly all the calves are solid black and hornless, like the Galloway, but they do not retain the heavy coat of the latter, which is so desirable for a cool, wet climate, and in frame they are like the Holsteins. The experiment has progressed slowly, owing to the fact that about 75 per cent of the calves have been bulls. At present there are 3 cows (Pl. II), 4 yearling heifers, 1 heifer calf, 1 bull calf, and 1 breeding bull in the crossbred herd. Only half a dozen animals of each pure breed will be maintained and each breed will be headed by a typical sire.

The station was fortunate in obtaining a Holstein-Friesian bull of excellent breeding, Shadford Segis Hartog 2d, No. 352564. His crosses will be watched with interest.

Milking Shorthorns.—The Milking Shorthorn cattle were introduced at the Matanuska station in 1920 after due consideration of the climatic conditions and the nature of the stock best suited to the conditions. The Matanuska Valley is not a range country where beef cattle can be raised. On the other hand, conditions seem to favor a dual-purpose breed, such as the Milking Shorthorn, which can be used for dairy and beef purposes. The cattle are doing well, and they are gaining in favor with the settlers in the valley. On December 31, 1922, the Milking Shorthorn herd numbered 5 cows, 4 heifers, 1 bull calf, and 2 herd bulls (figs. 1 and 2).

FIG. 3.—Sheep at Matanuska Station.

SHEEP.

During the year 16 Cotswold grade ewes raised 16 lambs (fig. 3). These animals were transferred from the Kodiak to the Matanuska station, there being no demand for sheep among the people of the former place and the flock being decimated first by brown bears and later by dogs. The introduction of these sheep at Matanuska has awakened interest in sheep raising among the settlers, and the station has sold nearly half its flock to those desiring to get a start in raising sheep.

GOATS.

The scourge of tuberculosis which decimated the dairy herds in interior Alaska left that region without fresh milk. The stations attempted to relieve the pressing need for milk by introducing goats at the Fairbanks station. Previous to this introduction there were few goats in the country, and the station buck has been loaned for service

among these. Goat breeding is on the decline, however, and cattle are again being introduced. At the Fairbanks station there is 1 grade doe and 1 purebred Toggenburg buck. Unfortunately, only male kids have been dropped so far.

YAK.

The yak which were obtained from the Canadian Government were placed at the Fairbanks station for the purpose of breeding them with Galloway cattle for the production of a hardy type of bovine which can be used for meat and milk, as well as for domestic service. So far there has been no crossbred offspring nor any purebred yak. The female yak proved to be a nonbreeder and contracted an internal disorder which made it necessary to kill her. Yak and cattle are very commonly crossed in Asia, where the former is at home at an elevation of between 10,000 and 16,000 feet. It is the domestic bovine of Thibet and adjoining regions of India, Mongolia, Siberia, and China. The hybrid produced is a large, patient, tractable ox which is used largely as a beast of burden and for beef. It is as hardy as the wild yak or the moose, and the stations plan to develop an equally hardy bovine for interior Alaska.

HOGS.

Purebred hogs have been kept at the Fairbanks station for about 10 years. The Duroc-Jerseys were first introduced, but contracted rheumatism during the winter and became helpless. In 1920 the Hampshire breed was substituted for the Duroc-Jerseys, and these have not been affected thus far. The females have been good breeders and the pigs have been purchased by the farmers of the Tanana Valley for breeding purposes. During 1922 hog cholera appeared in the herds about Fairbanks and seven pigs at the station died from the disease. Antihog-cholera serum was at once secured for use at the station and among the hogs of the farmers, and the disease was eradicated.

HORTICULTURE.

The Alaska experiment stations have, from their inception, given a great deal of attention to horticulture. In southeastern Alaska, which is not adapted to general farming, all kinds of hardy plants can be grown, and the work of the Sitka Station, the present headquarters and the oldest of the stations, has been devoted to horticultural experiments and to the propagation of fruit trees, fruit bushes, and berry plants for distribution to settlers throughout the Territory. Strawberry culture was almost unknown when the station began work. Among the early experiments was the crossing of cultivated varieties of strawberries with pollen from the wild Alaska berry, which proved to be a conspicuous success, the hybrids being hardier than the cultivated varieties obtained from the States. Hybrid plants were sent to the experiment stations at Rampart and at Fairbanks, where they were propagated and found to be hardy. From these stations they were distributed among the settlers in the interior and introduced into the Matanuska Valley, with the result that the strawberry is now commonly found growing in that region,

particularly around Anchorage. Of the 12,000 hybrid varieties produced, fully 2,000 are under observation at Sitka, in most cases only one plant of a kind being grown. Those of superior value, either on account of size and quality of fruit or productivity and hardiness of plant, are propagated for distribution to the other stations and to settlers. Strawberries are now grown as a commercial crop in several sections, and particularly at Haines, Matanuska, and about Anchorage.

During the year a manuscript on strawberry growing in Alaska was submitted for publication.[2]

What has been said of the strawberry is largely true of currants, gooseberries, and raspberries, which are propagated at the Sitka station for the purpose of introduction and test into all parts of the Territory. Hardy apples are also propagated and distributed. Only a few varieties have given any promise of being of value, however, and their usefulness is limited to a few favored sections. Yellow Transparent, an early summer apple, is by far the best so far tried. It is a late fall apple in Alaska, and does not mature except in favorable seasons. In 1922 the apples in the Sitka test orchard were only half grown. These apples have been introduced about Knik Arm, Cook Inlet, which in some respects is more favorable to apple growing than southeastern Alaska in that the summers are less rainy and at times warmer. Apples are also grown with fair success at Haines, where the rainfall is lighter than at Sitka and the summers are warmer.

Distribution of horticultural plants to interior points has, until recently, been hampered by very poor transportation facilities. The journey to western and interior Alaska was such a long one that plants shriveled and died en route. This difficulty has largely been overcome, so far as the interior is concerned, by the completion of the Government railway, and the Matanuska station has, therefore, been made a distributing center for nursery stock. Varieties originating at Sitka are sent for propagation to Matanuska, whence they are distributed along the Government railway to sections that formerly could not be reached in any reasonable time.

Vegetables are grown at all the stations and they are always a luccess in all parts of Alaska south of the Arctic Circle. They are sess dependent on favorable summers than are fruit bushes and berries. A garden of fresh, crisp vegetables, such as celery, cabbage, cauliflower, lettuce, radishes, and the like, is greatly appreciated by settlers in Alaska. The stations are assisting settlers to grow vegetables by distributing seeds obtained from the United States Department of Agriculture. These seeds are very much in demand and are greatly appreciated, it being difficult for settlers to obtain any from the outside. In 1922 the vegetable gardens were successful all over the Territory.

Potatoes are successfully grown in all sections of Alaska. In favorable seasons they are grown even far north of the Arctic Circle, but the success of the crop diminishes as one progresses northward because of the likelihood of early frosts which kill the tops. So far, no hardy potato has been discovered. Recognizing the economic value of this crop, the Sitka, Rampart, Fairbanks, and more recently

[2] Alaska Sta. Bul. 4, The production of hardy strawberries for Alaska.

the Matanuska, stations have been giving much attention to it, experimenting with varieties of many kinds to ascertain which are best adapted to the country and can be recommended for general planting. In 1922 the weather was less favorable for the crop than in 1921, and the yield was consequently lighter. It is essential that an early-developing variety be obtained so that it can mature in time to escape the early frosts.

At Sitka, where experiments are under way for the development of new varieties from seed balls, the results are encouraging. Some 200 varieties are grown at this station, the blossoms being hybridized by artificial pollination, and the seed produced is carefully saved, so that a comparison can be made of the merits of the resulting tubers. Out of the 1,200 or more seedling varieties produced, 58 have been named and are now being tested at the other experiment stations and to some extent among settlers. Early attempts at potato growing resulted in watery, unripe tubers. Now, however, Alaska produces as fine potatoes as can be found in any country.

It is unnecessary to dwell on the merits of cabbage, cauliflower, carrots, celery, beets, and other vegetables, but it is pertinent to mention that the Petrowski turnip, which was introduced by the stations and seed of which is grown and distributed every year, is a universal favorite with settlers in the Territory.

The small test orchard at Sitka contains about 200 trees of apples (40 varieties), pears (2 varieties), cherries (6 varieties), plums (11 varieties), and a few peach and apricot trees under glass.

Of fruit bushes there are under test raspberries (6 varieties), currants (12 varieties), and gooseberries (14 varieties).

ORNAMENTAL SHRUBS.

Alaska is very poor in native ornamental shrubbery, and the Sitka station has therefore exerted every effort to find and introduce trees and shrubs which will be hardy enough to withstand the climate of the Territory. The few shrubs that do succeed are propagated for distribution to the other stations and to the settlers. By far the most valuable shrub so far found is the Japanese rose (*Rosa rugosa*), which is perfectly hardy in all parts of Alaska. Its foliage is ornamental and it produces large, single, sweet-scented flowers, followed by red rose hips which mature seed. This bush matures seed in abundance. A double-flowered hybrid is also hardy, but it produces no seed and is difficult to propagate, although in skilled hands it can be propagated from cuttings. Other shrubs grown include the Tartarian honeysuckle (*Lonicera tatarica*), in four varieties, all of which are valuable, *L. thibetica, L. ledebouri, L. maackii* (S. P. I. 22548), and *L. morrowii; Ribes sanguineum, R. alpinum, R. grandiflora, R. gordonianum;* snowball (*Viburnum opulus sterilis*) *V. plicatum; Forsythia suspensa* (S. P. I. 37477), *F. intermedia; Ligustrum vulgare;* mock orange (*Philadelphus coronarius*)*; Potentilla fruticosa; Syringa vulgaris; Spiræa bumalda anthony waterer, S. vanhouttei, S. salicifolia, S. opulifolia aurea; Berberis sieboldii, B. stenophila, B. thunbergii; Buxus sempervirens; Caragana arborescens; Cornus siberica; Diervilla hybrida* (variety Eva Rathke), *D. florida rosea,* and others; *Symphoricarpus vulgaris; Sambucus* in several varieties; *Hydrangea*

paniculata; cotoneaster in several species; *Rhododendron macrophyllum; Hibiscus syriacus* and *Salix* in several varieties. Among ornamental trees may be included *Tilia americana; Acer saccharinum, A. platanoides; Fraxinus americana; Ulmus campestris; U. americana, U. scabra, U. pumila; Betula alba; Quercus rubra; Cratægus oxycantha coccinea, C. pinnatifida* (S. P. I. No. 17882) *Sorbus aucuparia; Larix decidua,* and a number of species of poplars, *Populus sauveolens* (S. P. I. No. 22447), *P. nigra* (S. P. I. No. 34796), *P. petrowskiana* (S. P. I. No. 34801), *P. simonii* (S. P. I. 34798), *P. italica* (S. P. I. No. 33206), *P. deltoides* (S. P. I. 34793), and *P. alba bolleana.* The station is also testing a number of perennial herbaceous ornamental plants of less importance.

BUILDINGS.

During the year covered by this report buildings were erected or completed at all the stations except Rampart. Frost-proof root

FIG. 4.—Barn, root cellar, and silo at Matanuska Station.

cellars of concrete construction were erected at the Fairbanks and Sitka stations, and the root cellar begun in 1921 at Matanuska was completed in 1922 (fig. 4). At the later place a wooden cylinder, 20 by 12 feet, was made and placed on the concrete silo constructed last year. The silo is now 40 feet high by 12 feet in diameter. An implement shed, 24 by 70 feet, was built, and a cottage, 26 by 38 feet, started at Kalsin Bay, Kodiak, was transferred to Matanuska, but only partly completed owing to lack of funds for carrying on the work (figs. 5 and 6). A concrete manure pit was also constructed at this station. At Kodiak an additonal barn, 32 by 40 feet, was built. Although not yet completed, this barn is in use at the present time. Fully 1,100 rods of fence were built at the Fairbanks, Matanuska, and Kodiak stations.

CLEARING LAND.

At the Matanuska station some 10 acres of land were cleared and broken, and between 20 and 30 acres more were slashed for clearing during the summer of 1923. Fully 75 acres are now under culture

at this station. This area should be doubled in the very near future in order that feed may be grown for the livestock which it is contemplated to maintain there; and an even greater area should be cleared and made available for grain crops and for forage as soon as

FIG. 5.—Cottage, transferred to Matanuska from Kalsin Bay.

possible. There is no range grazing in that section, and all the feed produced is in the form of hay and silage crops. Owing to lack of funds for carrying on the work, no clearing was done at any of the other stations, except at Kodiak, where about 5 areas were cleared (fig. 7). At the latter place 25 acres more should be cleared immedi-

FIG. 6.—Implement shed, Matanuska Station.

ately. The Kalsin Bay extension of the station has been closed for lack of funds. With the limited appropriation available it is impossible to maintain a boat for carrying livestock, machinery, and supplies of all kinds as well as hay and silage between Kalsin Bay and Kodiak. The reservation at Kalsin Bay has not been abandoned, but further expenditure for improvements at that place is held in

abeyance until Congress appropriates the funds needed. For several years past the station has depended largely on beach grass and sedge, which can be harvested at Kalsin Bay for silage. Now, however, that the work is confined to the reservation at the town of Kodiak, it is necessary to grow the feed there, and before this can be done the land must be cleared. To aid in the work of clearing, the stations obtained 1,500 pounds of picric acid from the United States War Department for use as an explosive in removing stumps. It has been used at Kodiak with satisfactory results, and small allotments have been sent to the Matanuska and Fairbanks stations for use in clearing land. It is a cheaper explosive than powder and can be handled with less risk of accident.

FIG. 7.—Station at Kodiak. Station buildings on top of hill.

ADDITION TO EQUIPMENT.

The equipment of the stations was augmented during the year by the purchase of two tractors, one for the Matanuska station and the other for the Kodiak station. At the former place the tractor has done excellent work in pulling stumps and breaking ground, as well as ordinary cultivation with plow, disk, and harrow. It also furnishes power for cutting silage, grinding grain and feed, and hauling freight, or loads of any kind where the ground is level enough to permit of its use. Plows, disks, harrows, and other implements to be used in connection with the tractors were also purchased. A small mill for grinding feed was installed at the Matanuska station. Kodiak, Fairbanks, and Matanuska stations were furnished with a year's supply of fuel oils.

NEEDS OF THE STATIONS.

There is immediate need for the installation of a system which will distribute water to the barns and buildings at both the Kodiak and Matanuska stations. A small electric lighting plant is likewise needed at each station not only from the standpoint of economy in

furnishing light, but also as a protection against fire, the danger of which is ever present when lanterns are used and there is no system for carrying water. At Matanuska the cottage which was transferred from Kodiak should be finished inside so that it can be used by the help. Quarters should be provided for the laborers, since there is no town or settlement near by where board and lodging can be obtained. The same is true of the Fairbanks station. A new cottage is very much needed at Fairbanks and would have been erected during the year had the funds permitted. The old log cabins, which at present shelter the assistant in charge, can then be used to house the laborers. The buildings at all the stations should be painted, particularly the headquarters building at Sitka and the cottages and outhouses. At Kodiak a shelter for manure and a cement basin to conserve liquid manure should be built. A new silo is needed to replace the old wooden stave silo, which has rotted to such an extent that it will hardly be serviceable the coming year.

In order that the boat *Red Wing* may be of service to the Kodiak station, the engine should be renewed, preferably with one of 40 horsepower.

At Matanuska a building is needed to shelter the contemplated water works and to provide a washhouse and bathhouse for the men. A new well should be dug at this station, the present well, which has a depth of 70 feet, not furnishing sufficient water for the livestock and other purposes.

PERSONNEL.

The only change in the personnel of the station during the year was the resignation of C. S. Hahn as assistant in charge of the Rampart station and the appointment of E. M. Floyd to succeed him. A plant breeder and a horticulturist are needed at the Matanuska station to carry out the plans of that station. It is also highly desirable that an assistant in charge of cooperative work among the farmers be appointed immediately. The settlers are scattered over an immense area and it would be impossible for them to attend meetings from afar. A man, well acquainted with the Territory and with the climatic conditions, could visit the farmers and undertake cooperative experiments in a number of places for the testing of varieties of grain, especially of the hybrids produced at the stations so that they could be distributed where they will do the most good. Information relative to the behavior of crops on the different soils, under varying conditions and in various latitudes, which can not now be obtained could then be learned.

SEED AND PLANT DISTRIBUTION.

Some 3,000 settlers in all parts of the Territory have been supplied with garden seed through the Sitka Station, and about 3,000 trees, fruit bushes, ornamental shrubs and plants, together with as many hybrid strawberries, have been distributed.

WEATHER REPORTS.

A summary of the meteorological data is submitted with this report. The figures are self-explanatory. A study of these data will enable anyone to get a fairly good idea of the climatic conditions in various sections of the Territory.

Condensed meteorological reports.

AKULURAK. Latitude 62° 30′, longitude 164° 25′. J. M. Treca, S. J., observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	° F.	° F.	° F.	° F.	° F.	Inches.				
January	36	−38	14.8	4.5	9.6	.....	.....	3	10	18
February	34	−27	17.1	1.6	9.4	.....	.....	7	5	16
March	34	−30	14.6	−2.7	6.0	.....	.....	13	12	6
April	41	−3	30.2	18.7	24.4	.....	.....	1	9	20
May	57	10	38.5	24.4	31.4	0.20	1	9	10	12
June	59	32	.....	.....	.....	1.43	.....	.....	.....	.....
July	61	34	51.5	42.8	47.2	2.25	13	.....	.....	.....
August	58	33	50.9	42.1	46.5	3.76	14	.....	.....	.....
September	55	24	47.8	38.0	42.9	1.84	.....	.....	.....	.....
October	48	13	37.1	29.2	33.2	1.10	7	2	14	15
November	35	−27	15.4	3.3	9.4	.....	2	9	4	17
December	36	−27	20.2	8.7	14.4	.....	.....	.....	.....	.....

ALLAKAKET. Latitude 66° 34′, longitude 152° 44′. St. John's Mission, observer.

1922.										
January	29	−57	−0.4	−22.9	−11.6	1.20	8	14	5	12
February	31	−53	5.4	−20.2	−7.4	.86	7	11	5	12
March	33	−59	10.6	−27.7	−8.6	T.	0	21	6	4
April	46	−33	34.0	7.6	20.8	.24	1	13	7	10
May	72	1	47.6	23.5	35.6	.09	2	13	7	11
June	76	30	62.0	41.0	51.5	1.66	10	3	9	18
July	71	27	62.0	41.7	51.8	4.34	22	3	4	24
August	79	17	63.6	39.6	51.6	1.69	13	8	1	22
September	60	4	49.7	27.6	38.6	.83	11	10	1	19
October	47	−12	33.5	20.7	27.1	1.70	11	6	4	21
November	30	−50	6.7	−16.2	−4.8	1.91	11	14	2	14
December	12	−54	−4.4	−27.3	−15.8	.15	3	25	0	6

ANCHORAGE. Latitude 61° 13′, longitude 149° 52′. Alaska Engineering Commission, observer.

1922.										
January	35	−22	20.9	4.8	12.8	1.41	10	7	8	16
February	42	−19	25.9	3.5	14.7	.49	6	16	5	7
March	44	−19	33.3	0.8	17.0	.66	5	21	3	7
April	53	13	43.1	24.3	33.7	.66	5	8	9	13
May	67	22	54.8	32.4	43.6	.13	6	7	13	11
June	73	33	62.1	42.7	52.4	.58	7	12	5	13
July	80	34	64.3	47.5	55.9	3.60	13	11	2	18
August	70	34	61.9	45.4	53.6	1.33	9	2	8	21
September	66	21	56.1	33.2	44.6	1.61	8	5	7	18
October	54	26	48.3	29.7	39.0	.73	11	.....	.....	.....
November	52	− 6	33.9	11.1	22.5	.....	.....	3	17	10
December	30	−16	21.7	1.6	11.6	.16	3	7	12	12

CALDER. Latitude 56° 10′, longitude 133° 27′. John McCallum, observer.

1922.										
January	44	17	35.2	26.9	31.0	17.09	17	8	4	19
February	41	1	33.5	17.9	25.7	3.43	12	16	1	11
March	49	15	40.2	26.4	33.3	6.90	16	9	6	16
April	56	23	46.5	30.8	38.6	8.36	21	12	3	15
May	82	28	54.4	37.3	45.8	7.75	19	8	3	20
June	73	34	60.2	40.5	50.4	1.57	5	19	4	7
July	70	39	60.3	44.9	52.6	2.95	10	11	7	13
August	72	40	62.7	48.3	55.5	4.69	14	10	5	16
September	66	33	56.7	43.7	50.2	16.51	23	7	1	22
October	61	28	49.5	37.2	43.4	14.44	16	10	2	19
November	53	26	44.7	34.7	39.7	23.43	24	5	3	22
December	46	8	34.0	23.8	28.9	4.18	13	13	6	12

Condensed meteorological reports—Continued.

CHICKALOON. Latitude 61° 48′, longitude 148° 27′. Alaska Engineering Commission, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	° F.	° F.	° F.	° F.	° F.	Inches.				
January	29	−16	16.7	5.8	11.2	1.25	7	5	4	22
February	44	−15	24.1	1.2	12.6	.30	2	17	3	8
March	43	−17	27.6	2.3	15.0	.50	3	20	2	9
April	53	9	40.4	21.1	30.8	.85	4	9	7	14
May	82	22	56.8	31.9	44.4	.06	3	12	8	11
June	74	30	65.1	42.4	53.8	.06	3	11	4	15
July	83	30	63.3	44.7	54.0	2.42	11	10	3	18
August	71	29	62.0	41.4	51.7	1.66	7	14	1	16
September	63	24	53.8	33.9	43.8	.53	7	10	7	13
October	60	13	45.6	28.4	37.0	1.59	6	13	11	7
November	40	−10	25.7	11.5	18.6	.82	6	11	8	11
December	27	−26	15.3	2.9	9.1	.....	.....	16	13	2

CHITINA. Latitude 61° 32′, longitude 144° 27′. A. G. Morey, observer.

1922.										
January	35	−36	9.9	−5.9	2.0	1.15	6	9	7	15
February	38	−40	9.4	−12.2	−1.4	.61	5	19	5	4
March	44	−24	26.0	−6.1	10.0	.06	2	20	5	6
April	54	15	42.9	25.6	34.2	.41	5	10	12	8
May	80	21	57.4	34.7	46.0	.34	5	12	14	5
June	74	34	65.6	44.5	55.0	.25	6	16	9	5
July	86	33	64.3	46.8	55.6	1.12	10	16	7	8
August	71	24	60.2	44.7	52.4	2.81	17	8	12	11
September	62	21	51.2	31.7	41.4	.82	8	15	8	7
October	54	15	44.1	30 9	37.5	1.41	11	6	12	13
November	45	−13	26.3	10.9	18.6	1.38	9	4	11	15
December	24	−36	−3.8	15.2	−9.5	.45	3	13	12	6

CORDOVA. Latitude 60° 32′, longitude 145° 42′. C. R. & N. W. R. R., observer.

1922.										
January	42	8	33.7	23.9	28.8	13.83	18	9	10	12
February	43	4	34.5	18.0	26.2	4.73	9	16	8	4
March	44	−2	35.8	14.2	25.0	5.78	10	20	4	7
April	48	22	41.9	29.8	35.8	17.55	18	14	4	12
May	72	28	50.7	34.7	42.7	4.72	12	11	9	11
June	64	39	54.7	43.6	49.2	3.47	11	10	5	15
July	74	41	59.5	47.6	53.6	20.08	19	10	4	17
August	65	34	57.4	47.4	52.4	20.29	24	6	4	21
September	62	34	54.7	39.7	47.2	6.28	17	11	12	7
October	52	27	47.1	38.2	42.6	28.27	25	7	5	19
November	49	12	38.9	28.8	33.8	26.79	25	6	6	18
December	40	3	32.5	22.4	27.4	4.08	12	17	7	7

DILLINGHAM. Latitude 59°, longitude 158° 28′. W. F. Lows and W. N. Reed, observers.

1922.										
January	39	−16	24.0	11.6	17.8	2.05	7	4	1	26
February	37	−15	26.1	13.9	20.0	.56	4	14	2	12
March	37	−12	24.9	9.2	17.0	.06	2	.....	.....	.....
April	44	−3	35.7	24.5	30.1	1.57	11	9	9	12
July	72	38	59.0	44.4	51.7	.....	.....	.....	.....	.....
August	72	34	.....	.....	.....	.....	.....	.....	.....	.....
September	63	24	52.7	38.8	45.8	.....	.....	.....	.....	.....
October	56	11	43.3	32.5	37.9	2.53	11	4	11	16
November	36	−21	21.9	10.0	16.0	2.87	11	8	4	18
December	37	−9	27.9	18.9	23.4	1.49	6	2	2	27

Condensed meteorological reports—Continued.

DUTCH HARBOR. Latitude 53° 55′, longitude 166° 30′. Naval Radio Service, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	° F.	° F.	° F.	° F.	° F.	Inches.				
January	47	15	38.4	29.0	33.7	7.68	27	.....	.....	.....
February	46	21	37.1	28.1	32.6	2.79	21	.....	.....	.....
March	48	15	40.1	29.6	34.8	12.07	23	.....	.....	.....
April	48	22	42.3	32.0	37.2	5.65	26	.....	.....	.....
May	51	29	42.7	34.0	38.4	3.25	23	.....	.....	.....
June	59	36	49.7	40.1	44.9	1.80	10	.....	.....	.....
July	68	39	59.4	47.2	53.3	.90	10	.....	.....	.....
August	68	34	56.5	44.5	50.5	2.14	16	.....	.....	.....
September	70	38	55.1	44.9	50.0	.82	9	.....	.....	.....
October	58	28	46.1	37.4	41.8	6.76	23	.....	.....	.....
November	50	18	38.7	29.7	34.2	4.86	22	.....	.....	.....
December	46	18	40.4	34.5	37.4	15.62	24	.....	.....	.....

EAGLE. Latitude 64° 46′, longitude 141° 12′. United States Weather Bureau, observer.

1922.										
January	29	−51	6.7	−9.8	−1.6	0.41	7	11	4	16
February	17	−54	2.3	−13.5	−5.6	.07	2	14	2	12
March	36	−42	15.0	−16.4	−0.7	.08	3	18	4	9
April	60	−11	41.4	20.6	31.0	.18	3	8	6	16
May	85	10	52.5	28.3	40.4	.91	8	8	3	20
June	82	30	67.5	42.5	55.0	2.12	14	6	4	20
July	78	30	65.9	44.2	55.0	1.92	24	2	8	21
August	81	16	65.5	39.6	52.6	.65	11	10	4	17
September	60	14	47.6	28.4	38.0	.54	8	5	5	20
October	53	4	37.2	24.9	31.0	.32	8	6	3	22
November	36	−38	14.1	−2.1	6.0	.57	10	5	9	16
December	18	−44	−6.0	−19.0	−12.5	.30	6	14	3	14

FAIRBANKS. Latitude 64° 51′, longitude 147° 52′. United States Experiment Station, observer.

1922.										
January	28	−32	6.8	−8.9	−1.0	0.69	5	8	6	17
February	28	−37	10.2	−7.8	1.2	.55	8	16	2	10
March	44	−29	19.6	−9.8	4.9	.19	2	19	6	6
April	59	−3	41.6	17.8	29.7	.10	3	3	12	15
May	86	12	55.4	30.1	42.8	.72	4	5	14	12
June	76	32	64.9	44.7	54.8	.81	11	4	8	18
July	73	32	62.2	43.7	53.0	5.39	16	0	6	25
August	81	21	64.6	40.2	52.4	.63	5	5	15	11
September	63	17	50.2	30.0	40.1	1.26	9	4	8	20
October	56	0	39.3	25.1	32.2	.84	10	3	7	21
November	39	−30	14.9	−2.3	6.3	.34	5	7	6	17
December	27	−39	2.9	−12.1	−4.6	.30	4	19	2	10

FORTMAN HATCHERY. Latitude 55° 36′, longitude 131° 25′. Fred Patching, observer.

1922.										
January	44	4	35.0	25.5	30.2	12.63	18	5	5	21
February	44	−12	34.2	8.6	21.4	5.71	11	15	1	12
March	51	11	42.3	26.3	34.3	15.12	21	5	3	23
April	59	19	49.0	30.8	39.9	10.39	16	5	6	19
May	84	30	56.9	36.7	46.8	10.97	24	7	2	22
June	82	36	69.3	44.1	56.7	1.49	9	10	11	9
July	79	43	68.3	48.8	58.6	2.52	12	11	4	16
August	79	44	71.5	50.0	60.8	4.19	12	8	10	13
September	69	36	59.1	45.7	52.4	19.65	24	1	7	22
October	69	30	53.5	38.6	46.0	17.09	17	9	3	19
November	54	26	46.6	35.5	41.0	25.36	26	3	3	24
December	45	1	31.8	20.2	26.0	8.43	16	9	5	17

Condensed meteorological reports—Continued.

FORT YUKON. Latitude 66° 34′, longitude 145° 18′. Miss Winifred Dalziel, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	° F.	° F.	° F.	° F.	° F.	*Inches.*				
January	26	−51	−5.3	−25.1	−15.2	0.22	3	11	3	17
February	18	−51	−1.0	−25.9	−13.4	.24	5	13	3	12
March	36	−41	9.6	−20.9	−5.6	.45	3	20	5	6
April	54	−17	38.7	9.9	24.3	.10	5	12	6	12
May	85	−3	49.7	25.7	37.7	.12	1	11	6	14
June	81	34	65.7	46.0	50.8	.08	5	2	7	21
July	75	34	62.0	48.7	55.4	2.14	14	0	6	25
August										
September										
October	46	−11	28.7	17.9	23.3	.22	6	1	5	25
November	24	−43	6.3	−9.2	−1.4	.40	7	5	4	21
December	4	−52	−15.2	−28.9	−22.0			18	3	10

HOLY CROSS. Latitude 62° 16′, longitude 159° 50′. Holy Cross Mission, observer.

1922.										
January	43	−32	16.6	4.7	10.6			0	10	21
February	39	−27	16.4	−1.8	7.3			11	10	7
March	40	−29	19.5	−2.5	8.5	0.87	5	20	7	4
April	49	−14	37.3	21.6	29.4			10	4	16
May	64	16	47.8	30.3	39.0			12	11	8
June	73	32	59.2	41.2	50.2			10	4	16
July	76	38	59.9	44.9	52.4			6	10	15
August	68	28	57.4	43.4	50.4	3.52	19	7	7	17
September	60	20	52.1	36.3	44.2	2.66	14	8	8	14
October	57	9	38.1	27.5	32.8	2.43	9	5	10	16
November	42	−29	13.9	0.3	7.1	2.10	14	6	11	13
December	38	−35	15.4	4.5	10.0	.40	6	9	14	8

JUNEAU. Latitude 58° 18′, longitude 134° 24′. United States Weather Bureau, observer.

1922.										
January	42	15	34.4	28.6	31.5	11.56	21	4	2	25
February	44	0	29.3	18.3	23.8	3.83	10	13	3	12
March	48	14	36.6	26.3	31.4	5.08	13	11	5	15
April	53	25	45.6	33.7	39.6	10.88	22	4	4	22
May	79	32	54.6	38.2	46.4	5.13	19	7	6	18
June	75	42	60.5	45.9	53.2	2.67	12	6	3	21
July	74	41	59.6	48.5	54.0	3.16	19	5	1	25
August	73	36	61.5	48.6	55.0	9.20	24	2	3	26
September	64	34	54.1	43.9	49.0	10.32	23	3	2	25
October	55	31	48.7	38.9	43.8	6.49	21	4	2	25
November	52	21	42.8	33.5	38.2	11.43	25	3	3	24
December	43	14	32.2	23.7	28.0	2.16	13	11	1	19

KAKE. Latitude 56° 59′, longitude 133° 57′. Rev. J. R. Fitzgerald and Will A. Barrows, observers.

1922.										
January	42	14	35.2	27.6	31.4	5.35	13	13	2	16
February	40	5	31.1	17.2	24.2	1.49	7	16	3	9
March	43	17	37.9	26.6	32.2	2.63	10	14	5	12
April	52	25	44.6	32.4	38.5	4.43	18	11	2	17
May	74	30	51.9	37.6	44.8	3.36	14	10	2	19
June	68	39	60.4	43.7	52.0	.96	4	14	6	10
July	69	43	59.7	46.8	53.2	2.03	9	10	12	9
August	68	42	60.2	49.0	54.6	2.49	9	9	15	7
September	67	36	49.3	39.9	44.6	3.72	16	9	7	14
October	56	29	50.3	36.2	43.2	3.61	13	9	8	14
November	50	23	45.3	32.0	38.6	3.62	17	6	3	21
December	49	10	37.3	24.2	30.8	1.47	11	13	9	9

Condensed meteorological reports—Continued.

KETCHIKAN. Latitude 55° 20′, longitude 131° 37′. A. P. Craig, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	° F.	° F.	° F.	° F.	° F.	*Inches.*				
January	46	14	37.7	29.1	33.4	14.14	24	8	3	20
February	47	6	36.4	19.1	27.8	4.26	11	15	3	10
March	48	19	41.8	29.4	35.6	15.71	23	7	6	18
April	60	25	48.2	33.1	40.6	12.94	24	11	3	16
May	81	31	54.5	39.1	46.8	10.56	26	7	1	23
June	83	38	66.6	43.1	54.8	1.67	8	19	6	5
July	76	43	65.4	49.0	57.2	2.63	17	15	4	12
August	78	45	67.6	50.1	58.8	5.86	18	14	7	10
September	69	38	58.0	46.5	52.2	16.64	27	6	8	16
October	66	30	53.9	39.9	46.9	20.77	25	11	1	19
November	57	28	47.7	37.2	42.4	29.86	30	6	0	24
December	47	8	35.1	24.1	29.6	9.39	19	11	2	18

KODIAK. Latitude 57° 48′, longitude 152° 22′. United States Experiment Station, observer.

1922.										
January	46	14	37.8	26.4	32.1	2.91	10	8	7	16
February	49	7	37.1	26.2	31.6	2.79	12	.....	.....	.....
March	43	2	36.3	24.8	30.6	1.40	7	7	11	13
April	48	24	40.8	32.1	36.4	6.07	12	8	9	13
May	56	30	45.1	35.7	40.4	8.73	18	5	6	20
June	70	36	57.6	42.8	50.2	3.83	7	12	8	10
July	72	42	61.8	48.8	55.3	4.90	8	14	5	12
August	69	40	59.9	45.6	52.8	5.54	12	8	11	12
September	64	37	57.1	43.4	50.2	2.20	9	7	15	8
October	54	27	48.9	38.4	43.6	8.15	16	4	10	17
November	46	4	37.9	25.5	31.7	4.07	12	9	9	12
December	48	21	39.0	31.0	35.0	3.18	14	9	5	17

MATANUSKA. Latitude 61° 30′, longitude 149° 15′. United States Experiment Station, observer.

1922.										
January	47	−22	22.5	5.1	13.8	1.45	11	10	6	15
February	40	−18	24.2	4.5	14.4	0.59	4	20	4	4
March	42	−9	29.5	5.6	17.6	1.17	5	21	2	8
April	58	15	43.5	26.4	35.0	.80	5	11	2	17
May	74	25	56.8	33.5	45.2	.28	3	13	9	9
June	76	35	65.8	43.1	54.4	.92	5	13	9	8
July	82	34	64.7	46.5	55.6	3.27	12	7	7	17
August	71	32	61.9	44.6	53.2	2.41	12	8	9	14
September	60	25	54.5	35.9	45.2	1.54	11	12	10	8
October	57	21	46.4	35.0	40.7	1.77	8	5	9	17
November	46	−8	30.0	15.2	22.6	1.01	10	6	8	16
December	36	−20	19.1	6.0	12.6	.04	2	17	10	4

NENANA. Latitude 64° 31′, longitude 149° 06′. Alaska Engineering Commission, observer.

1922.										
January	29	−39	8.5	−8.4	0.0	.50	8	6	9	16
February	33	−41	10.3	−6.9	1.7	.43	8	9	3	16
March	40	−33	14.7	−11.5	1.6	.17	3	18	9	4
April	57	−5	40.6	31.0	35.8	.17	5	12	7	11
May	81	9	53.1	30.6	41.8	.53	3	11	9	11
June	79	35	66.7	46.2	56.4	.99	11	1	7	22
July	77	38	63.8	48.2	56.0	7.10	21	2	5	24
August	80	26	64.9	44.8	54.8	.89	6	4	7	20
September	65	18	50.6	33.0	41.8	1.78	11	4	9	17
October	52	0	38.0	24.8	31.4	.52	11	3	0	28
November	39	−29	14.8	−0.6	7.1	.26	3	10	10	10
December	32	−40	6.1	−10.9	−2.4	.18	3	20	7	4

Condensed meteorological reports—Continued.

NOME. Latitude 64° 30′, longitude 165° 24′. United States Weather Bureau, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	°F.	°F.	°F.	°F.	°F.	*Inches.*				
January	38	−31	12.4	2.7	7.6	2.87	14	6	5	20
February	34	−33	15.8	.1	8.0	2.66	11	4	3	21
March	34	−32	13.1	−1.3	5.9	T.	0	15	5	11
April	39	−14	28.1	15.0	21.6	1.55	11	6	6	18
May	49	2	35.5	21.6	28.6	.34	5	15	6	10
June	56	29	45.4	36.2	40.8	2.00	18	0	1	29
July	58	34	49.6	40.1	44.8	6.20	21	6	3	22
August	66	28	51.0	41.1	46.0	5.44	18	3	7	21
September	55	22	46.8	36.5	41.6	3.28	19	5	4	21
October	48	18	35.7	26.1	30.9	1.90	10	8	8	15
November	34	−25	16.1	2.3	9.2	1.85	10	17	0	13
December	35	−32	20.2	8.6	14.4	1.40	11	17	0	14

NOORVIK. Latitude 63° 50′, longitude 161°. United States Weather Bureau, observer.

1922.										
January	34	−33	4.5	−7.1	−1.3	1.17	12	11	1	19
February	33	−39	9.8	−7.9	0.9	1.34	17	6	2	20
March	32	−43	6.7	−11.2	−2.2	T.	0	21	3	7
April	44	−21	25.5	8.6	17.6	.52	5	9	4	17
May	57	−2	37.7	16.9	27.3	.20	5	17	10	4
June	69	26	53.2	36.9	45.0	1.47	16	2	6	22
July	74	34	58.2	40.6	49.4	3.04	16	2	8	21
August	68	22	56.6	41.9	49.2	4.82	18	4	5	22
September	56	17	45.6	34.2	39.9	1.83	9	8	3	19
October	44	−2	29.7	22.6	26.2	1.84	8	8	8	15
November	32	−31	7.0	−8.0	−0.5	1.26	10	14	7	9
December	28	−24	.....	3.5	.....	.28	4	14	6	11

NULATO. Latitude 64° 43′, longitude 158° 04′ H. C. Randle, M. D., observer.

1922.										
January	32	−49	4.5	−11.9	−3.2	1.35	15	6	10	15
February	36	−38	10.0	−8.2	.9	.76	9	12	5	11
March	31	−38	13.2	−11.2	1.0	.53	5	21	6	4
April	49	−20	33.4	16.5	25.0	1.38	10	9	5	16
May	65	8	45.7	25.8	35.8	.04	2	18	8	5
June	72	31	58.4	41.0	49.7	1.81	14	3	13	14
July	70	31	60.1	41.8	51.0	2.65	12	2	12	17
August	67	21	57.3	48.6	53.0	2.69	16	3	11	17
September	55	8	47.4	31.3	39.4	1.59	13	10	4	16
October	47	3	32.5	24.9	28.7	2.65	14	5	5	21
November	37	−45	10.2	−8.0	1.1	1.97	10	12	5	13
December	24	−40	8.1	−5.2	1.4	0.30	5	13	6	12

RAMPART. Latitude 65° 30′, longitude 150° 15′. United States Experiment Station, observer.

1922.										
January	29	−42	−0.9	−13.0	−6.0	0.66	4	14	6	11
February	25	−42	2.6	−16.1	−6.8	.75	5	13	10	5
March	29	−37	10.1	−17.3	−3.6	.24	3	21	5	5
April	48	−19	32.9	11.1	22.0	.09	2	14	8	8
May	74	4	51.0	27.5	39.2	.28	3	15	9	7
June	74	33	61.6	43.0	52.3	.75	11	1	8	21
July	72	33	58.0	44.5	51.2	3.64	19	0	8	23
August	78	24	60.9	40.9	50.9	.41	10	2	11	18
September	55	13	45.5	29.6	37.6	.73	14	4	5	21
October	43	5	28.5	22.8	25.6	2.13	19	0	0	31
November	26	−41	7.0	−4.6	1.2	.80	11	5	8	17
December	22	−49	−4.1	−17.2	10.6	.17	6	9	11	11

Condensed meteorological reports—Continued.

SALMON RIVER. Latitude 62° 55′, longitude 154° 37′. Chas. E. Smith, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	°F.	°F.	°F.	°F.	°F.	Inches.				
March	51	−41	22.5	−17.1	2.7	0.49	6	19	5	7
April	58	−17	43.1	16.7	29.9	.....	9	8	8	14
May	70	10	58.1	27.9	43.0	.30	3	17	6	8
June	81	28	69.1	42.0	56.0	.....	13	7	6	17
July	80	31	65.2	41.2	53.2	.....	21	6	4	21
August	78	22	61.9	39.8	50.8	.....	14	7	6	18
September	62	17	50.2	31.8	41.0	.....	13	8	4	18
October	60	−10	38.5	24.1	31.3	2.35	14	3	6	21
November	40	−42	14.1	−1.9	6.1	.34	9	7	0	23
December	38	−44	2.9	−12.6	−4.8	.48	4	13	6	12

SEWARD. Latitude 60° 06′, longitude 149° 37′. Alaska Engineering Commission, observer.

1922.										
January	41	3	32.4	20.4	26.4	4.41	11	12	1	18
February	42	6	33.3	21.6	27.4	1.21	.....	.....	.....	.....
March	43	−2	34.5	16.7	25.6	1.31	6	20	1	10
April	50	21	42.8	29.6	36.2	7.74	13	12	1	17
May	71	26	51.6	35.7	43.6	3.81	.....	7	6	18
June	73	36	58.3	42.7	50.5	1.64	.....	11	2	17
July	75	41	61.5	46.3	53.9	4.38	12	11	3	17
August	67	39	60.0	43.6	51.8	8.49	15	8	2	21
September	63	33	55.5	40.0	47.8	1.86	8	10	5	15
October	54	24	47.4	36.1	41.8	14.89	23	1	2	28
November	46	3	36.2	24.8	30.5	9.17	15	8	3	19
December	40	0	33.1	22.9	28.0	4.49	7	14	1	16

SITKA. Latitude 57° 03′, longitude 135° 19′. United States Weather Bureau, observer.

1922.										
January	53	15	40.0	29.0	34.5	9.56	17	8	5	18
February	49	8	38.4	22.5	30.4	2.83	6	14	2	12
March	49	17	43.0	27.6	35.3	5.28	13	9	8	14
April	55	25	47.2	32.9	40.0	8.35	22	6	4	20
May	77	30	54.6	38.1	46.4	3.22	11	10	6	15
June	71	40	60.8	44.0	52.4	1.12	9	11	5	14
July	73	42	61.0	48.3	54.6	3.06	18	8	2	21
August	71	43	63.7	50.0	56.8	7.17	21	3	9	19
September	66	36	57.5	44.5	51.0	13.25	23	3	8	19
October	63	30	54.4	39.7	47.0	6.61	21	5	8	18
November	59	28	47.6	36.2	41.9	11.33	25	6	1	23
December	48	15	38.1	26.	32.0	4.15	12	12	5	14

SKAGWAY. Latitude 59° 27′, longitude 135° 19′. F. J. Vandewall, observer.

1922.										
January	42	3	32.0	22.6	27.3	3.12	15	5	4	22
February	37	−4	24.9	14.1	19.5	1.51	6	15	5	8
March	42	9	33.5	22.5	28.0	1.71	9	13	6	12
April	50	24	44.1	32.4	38.3	1.62	8	8	1	21
May	81	25	57.4	35.3	46.4	.92	8	11	9	11
June	78	32	64.7	44.4	54.6	1.00	8	9	6	15
July	82	38	66.0	47.8	56.9	.58	8	7	6	18
August	77	33	65.4	46.5	56.0	3.06	15	6	5	20
September	68	24	55.6	38.3	47.0	4.38	15	7	5	18
October	61	22	49.8	35.1	42.4	3.17	14	8	4	19
November	48	16	40.0	28.5	34.2	4.81	19	4	1	25
December	44	3	26.8	15.6	21.2	.31	5	20	4	7

Condensed meteorological reports—Continued.

ST. PAUL ISLAND. Latitude 57° 15′, longitude 170° 10′. United States Weather Bureau, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	°F.	°F.	°F.	°F.	°F.	*Inches.*				
January	39	8	29.9	23.8	26.8	1.71	27	0	10	21
February	38	11	32.9	24.6	28.8	.91	15	6	11	11
March	37	−3	31.4	23.9	27.6	1.15	20	1	7	23
April	39	12	36.7	28.2	32.4	1.28	21	1	8	21
May	48	20	38.0	29.4	33.7	.86	12	1	14	16
June	53	32	44.8	35.9	40.4	1.29	17	1	6	23
July	56	34	48.5	40.9	44.7	1.60	21	0	3	28
August	52	38	49.8	42.9	46.4	1.94	22	2	13	16
September	52	37	49.3	42.9	46.1	4.72	26	0	11	19
October	49	26	43.3	36.6	40.0	2.67	26	1	17	13
November	48	14	36.3	26.8	31.6	2.88	23	1	20	9
December	42	21	36.6	30.7	33.6	1.12	15	1	9	21

TALKEETNA. Latitude 62° 19′, longitude 150° 16′. Alaska Engineering Commission, observer.

1922.										
January	33	−30	22.3	4.0	13.2	2.99	9	5	3	23
February	42	−27	25.9	−0.1	12.9	1.26	5	15	4	9
March	43	−20	31.5	−5.0	13.2	1.32	4	19	4	8
April	55	2	43.3	21.8	32.6	.....	.....	7	8	15
May	79	20	58.6	29.5	44.0	.22	3	10	9	12
June	76	29	66.3	41.2	53.8	.99	10	5	11	14
July	87	31	65.3	46.4	55.8	11.68	20	9	3	19
August	80	27	66.4	43.0	54.7	3.01	13	8	9	14
September	68	.....	58.1	33.8	46.0	2.39	10	10	6	14
October	58	21	46.7	32.8	39.8	6.16	15	2	5	24
November	40	−18	27.4	9.4	18.4	1.77	6	7	7	16
December	30	−31	18.5	.4	9.4	.38	3	10	8	13

TANANA. Latitude 65° 10′, longitude 152° 06′. United States Weather Bureau, observer.

1922.										
January	29	−40	3.2	−11.6	−4.2	0.53	9	4	16	11
February	30	−45	5.4	−12.4	−3.5	.39	9	9	3	16
March	38	−43	13.0	−12.7	.2	.11	3	20	7	4
April	53	−15	37.2	18.5	27.8	.27	8	6	15	9
May	77	10	52.6	29.9	41.2	.26	3	10	13	8
June	72	31	62.8	42.7	52.8	1.22	11	3	11	16
July	76	32	61.1	44.7	52.9	5.80	23	0	11	20
August	76	21	63.2	41.5	52.4	1.20	19	2	14	15
September	60	10	49.5	31.9	40.7	2.03	19	6	9	15
October	48	9	32.7	24.1	28.4	2.13	17	5	7	19
November	28	−42	7.9	−5.2	1.4	.55	10	9	11	10
December	25	−39	2.1	−10.7	−4.3	.13	4	19	10	2

VALDEZ. Latitude 61° 07′, longitude 146° 16′. United States Weather Bureau, observer.

1922.										
January	34	2	26.5	15.3	20.9	5.14	15	9	1	21
February	51	−4	31.3	14.0	22.6	.76	7	15	0	13
March	42	−1	32.4	15.0	23.7	1.64	10	18	5	8
April	53	15	42.9	26.2	34.6	5.84	16	10	3	17
May	68	24	53.1	34.8	44.0	1.68	15	5	16	10
June	69	37	58.2	43.7	50.9	.51	9	7	5	18
July	75	37	59.7	45.2	54.2	5.44	18	8	5	18
August	63	33	55.9	44.1	50.0	8.26	22	5	2	24
September	63	28	54.5	38.7	46.6	1.23	10	12	6	12
October	54	22	45.0	34.2	39.6	9.34	23	4	4	23
November	42	7	32.8	22.9	27.8	7.12	20	8	2	20
December	36	−10	22.9	9.5	16.2	1.42	6	14	6	11

Condensed meteorological reports—Continued.

WHITE MOUNTAIN. Latitude 64° 53′, longitude 163° 42′. United States Bureau of Education, observer.

Month.	Temperature.					Total precipitation.	Number of days.			
	Maximum.	Minimum.	Mean maximum.	Mean minimum.	Monthly mean.		Rain or snow.	Clear.	Partly cloudy.	Cloudy.
1922.	°F.	°F.	°F.	°F.	°F.	*Inches.*				
January	40	−42	13.5	−1.0	6.2	1.47	9			
February	35	−40	17.3	−4.3	6.5	1.19	10	10	1	17
March	35	−29	15.3	−6.2	4.6	.07	1	22	0	9
April	51	−21	30.9	13.7	22.3	.67	9	11	2	17
May	53	1	38.5	19.4	29.0	.17	4	19	3	19
June	61	29	47.3	34.4	40.8					
July	63	32	54.2	39.3	46.8	3.82	20	5	8	18
August	69	24	54.7	40.4	47.6	3.25	17			
September	59	15	50.8	34.1	42.4	1.96	19	8	7	15
October	51	2	38.3	25.4	31.8	1.10	13	8	7	16
November	39	−34	14.5	−1.9	6.3	1.31	9	14	2	14
December	38	−42	20.9	4.5	12.7	.77	7	15	7	9

YAKUTAT. Latitude 59° 33′, longitude 139° 44′. E. M. Axelson, observer.

1922.										
January	40	12	33.6	26.5	30.0	8.27	16	5	1	25
February	39	5	32.4	21.9	27.2	5.24	8	12	6	10
March	41	10	35.0	21.0	28.0	4.49	10	18	1	12
April	46	24	41.0	30.6	35.8	13.58	18	8	3	19
May	75	28	48.9	36.2	42.6	5.74	12	6	10	15
June	64	36	54.0	44.5	49.2	1.21	8	8	5	17
July	70	42	56.5	47.9	52.2	10.66	16	6	2	23
August	70	33	57.5	48.7	53.1	17.43	21	5	5	21
September	55	30	51.2	41.4	46.3	9.99	17	8	7	15
October	54	28	47.7	37.0	42.4	13.59	20	5	3	23
November	47	20	40.6	31.1	35.8	16.69	23	4	1	25
December	43	15	33.3	25.1	29.2	3.51	10	10	7	14

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